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ABSTRACT

Designed to complement the manual, "Evaluation of Educational Software. A Guide to Guides," which provides an overview of 10 different models of microcomputer courseware evaluation instruments, this 5-section workshop guide outlines an approach to using the evaluation materials in a hands-on workshop setting. Session notes, reproducible handouts for the participants, and suggestions for implementation are included. The workshops begin with a discussion of key features of instructional and message design, including learning (cognitive) processes such as use of aids to memory and attention; language use and text characteristics; graphics and visual processing; the user's cognitive model; and feedback techniques. An overview covers the range of forms available in the "Guide to Guides." Procedures for hands-on evaluation of a correlated set of software examples (not included) are suggested, as well as alternatives to using the examples for groups without access to a compatible computer. The next section provides opportunities to describe and compare procedures, criteria, and formats of the 10 evaluation forms from the "Guide to Guides." Notes for the final session describe evaluation resources. Additional suggestions for the workshop group leader are included. (LMM)

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SEDL's Rx

A Workshop Package* for Computer-Using Educators

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Acknowledgements

The Regional Exchange at the Southwest Educational Development Laboratory (SEDL) produced the Evaluation of Educational Software: A Guide to Guides (March, 1983) in cooperation with the Northeast Regional Exchange (NEREX, Inc.). The purpose of the Guide to Guides is to provide an overview of ten different evaluation forms, gleaned from a wide base of development areas. The **R_X Workshop Package for Computer-Using Educators** is designed to complement the Guide to Guides, outlining an approach to using the evaluation materials in a hands-on workshop setting. Session Notes, reproducible Handouts for the participants, suggestions for the implementation of the training, and a sample disk of educational software (compatible with TRS-80, Model III) are provided for use in the R_X Workshop.

This Workshop packet was designed as a further step toward assisting educators in the responsible integration of the microcomputer in educational settings. The Southwest Educational Development Laboratory's Regional Exchange is committed to providing the highest quality materials and the most timely information to educators in the SEDL region. Thanks are due to Preston C. Kronkosky, Executive Director of SEDL, for his support, and to Martha L. Smith, Project Director (RX) for her creativity and guidance during the creation of this document. Special recognition is given to Claire J. Waring, Administrative Secretary (RX), for her dedication and hard work on the preparation of this Workshop packet. Diane E. Downing, Technical Writer (RX) is to be commended for her editorial work and support, and Floyd Ploeger (Staff Associate, RX) for his work on the software disk included in the R_X Workshop packet. The staff of the Regional Exchange are grateful to all who contributed their time and expertise in the preparation of this document.

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EVALUATION OF EDUCATIONAL SOFTWARE

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PREFACE

SUGGESTIONS FOR SESSION LEADERS:

The SEDL R_x Workshop based on the Evaluation of Software: A Guide to Guides is intended for educators who are involved in the selection of software for use with educational computers. The materials contained in the Guide to Guides were compiled in order to produce a resource book devoted to software evaluation. They are therefore oriented toward instructional resources used with educational computers. The Guide includes awareness and reference materials on informed software selection, ten different models of evaluation instruments, and information on resources which might prove useful in establishing a system of software evaluation.

The R_x Workshop is divided into five major sections, plus an evaluation-instrument which is intended to measure the participants' responses to the module. The workshop itself consists of the Session Notes, to be used by a group leader or trainer as a guide during the workshop, along with Participant Handouts correlated to sections of those Notes; a copy of the Evaluation of Educational Software: A Guide to Guides; and a sample disk copy of software programs for use in the hands-on evaluation portion of the training. The disk contains a range of educational programs, with varying content and grade level, and is compatible with a TRS-80, Model III computer.

Section One of the Notes is designed to characterize some key features of instructional and message design which may be important in effective software. The five areas covered in Section One include learning (cognitive) processes such as use of aids to memory and attention; language use and characteristics of text presented in the program; use of graphics and visual processing; the cognitive model of the user; and feedback techniques (Jay, 1983). The Session Notes in Section One are intended for use as a framework for group discussion on the points presented. The participants will be provided with handouts for each area in this section, outlining the major points. The handouts are to be used as a means of recording comments and individual concerns regarding the applicability of the concepts to each person's situation.

In Section Two, the participants will be given an overview of the range of forms available in the Guide to Guides. Ten different evaluation forms are included in order to introduce participants to a variety of format and content. The group leader should take note and remind the participants that the forms in Guide to Guides are only a representation of the field of evaluation instruments available at time of publication (as of Spring, 1983). These forms do not necessarily provide a definitive set of evaluation procedures, but they do represent some systems which have proven to be effective under given circumstances.

Evaluation of appropriate materials for use with microcomputers consists of more than simple application of a form. The exercises in this section, which exposes the participants to various instruments of evaluation, represent a step in the total evaluation process. The participant handout in Section Two is intended for consensus work in a small group session but may be effectively used by an individual. The participant(s) are to decide which elements listed are important in their review process, and which of the ten forms included in the Guide to Guides most satisfactorily account for those elements.

Participant Handout 2-A is a comment form, also for a small group consensus activity, to be used in choosing several of the forms which appear to be appropriate for the hands-on evaluation section. The trainer is advised to inform all participants that this system of selecting several of the forms for the hands-on evaluation session is merely for the convenience of time-saving during training.

IMPORTANT!

No one form should be eliminated or deemed not useful on the basis of the checklist activity. Each form should be considered as an alternative in specific cases. It is possible that an instructionally sound program will perform poorly on one form and rate highly on a different evaluation instrument. It should be stressed that this training is meant to expose participants to the techniques of software evaluation and the types of forms in Guide to Guides. It is not intended to indicate the "best" form or to determine the instructional soundness of the software samples included.

Section Three provides for hands-on evaluation of the examples of software included in the packet. Alternatives to using the packet's software sample are described for those groups which do not have access to computers which are compatible with the enclosed software. The group leader is advised to become familiar with the hardware used in the evaluation session. He/she should be able to load programs and instruct others in the basic procedures for using the programs being evaluated. During this section of the training, participants will have an opportunity to discover elements of software design which could be identified as appropriate to the educational settings for which they would be evaluating software.

Section Four provides an opportunity for participants to describe and compare procedures, criteria, and formats of evaluation forms from the Guide to Guides. The comparison exercise is intended for a large group discussion, facilitated by the leader. Specific suggestions for leading the participants' comments in constructive ways and documentation procedures for those comments (Participant Handout #4) are included in the Session Notes.

Section Five describes print and other resources which deal with educational software evaluation and reviews. The group leader is advised to attempt to secure copies of some of the publications listed in the resource section of the Guide to Guides, so that participants can be exposed to different types of information sources.

EVALUATION OF THE TRAINING SESSION:

At the end of the training materials in the module, the participant will find an evaluation form which refers to the effectiveness of the training session. The group leader should direct each participant to fill out the form as completely as possible. Evaluation on each training session using the Workshop will be compiled by the SEDL Regional Exchange staff and used to improve future training materials.

Any questions or concerns regarding the SEDL R_x Workshop or the Evaluation of Software: A Guide to Guides should be directed to:

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INTRODUCTION

- Rationale
- Goals
- Objectives
- References

EVALUATION OF EDUCATIONAL SOFTWARE:

Rationale:

According to a recent survey conducted by Market Data Retrieval, 24,645 schools are using computers in an instructional capacity, a 56% increase over 1981 figures. Another source cites 60% of school districts nationwide, and 31% of all schools as having access to microcomputers in 1982. The increase in educational computer placement in public schools across the country in 1983 is probably going to be inevitable.

The integration of the microcomputer, and the technological training and adaptation requirements which will accompany it, may pose vast problems for educators. A critical area of concern for school administrators, state departments of education, and local education personnel is the evaluation of educational software. Educators who find themselves in the position of selecting and reviewing software are suddenly responsible for evaluating a number of factors relating to the instructional soundness and applicability of curricular materials that may not fit well into a standard courseware evaluation format. The task of choosing software can include determining the material's appropriateness for grade level and subject area, soundness of instructional design, and placement in curricular scope and sequence across the grade levels. Some similarities exist between software evaluation techniques and more traditional educational evaluation of materials, such as textbooks, worktexts, and other mediated materials (including audio tapes, filmstrips, films, etc.). However, the evaluation of educational software presents unique challenges.

Reviews in educationally oriented microcomputer journals vary widely in reliability, primarily because of differing rationales and standards for review selections. The reader must determine whether the reviewer is discussing the material on a level that relates to the classroom or situation for which the software in question is being considered. This is a classic "apples versus oranges" comparison in which one must be certain that the intent and orientation of the author of the review is similar to that of the reader/consumer. One of the most difficult tasks for the reviewer of software is determining appropriateness for a given set of students. Often the assigned evaluator for

a school or district has no prior experience with the range of software available, and must face a staggering variety of educational materials. Some schools and districts have adopted a committee approach to software screening. But most districts are on their own when evaluating instructional programs for the schools' microcomputers.

As a means of addressing the issue of software evaluation, the Evaluation of Educational Software: A Guide to Guides (1983) was produced by the Southwest Educational Development Laboratory and Northeast Regional Exchange, Inc. This manual is a collection of ten different evaluation forms, along with suggestions for software evaluation and lists of resources useful to those making informed software decisions for educators.

This R_x Workshop has been developed by the Regional Exchange at SEDL and provides practical training for all educators who plan to use the Guide to Guides as a tool for responsible software evaluation.

Goals:

The Workshop has three overall goals:

- to provide an overview and facilitator/trainer's package, so that administrators from state education agencies will be able to disseminate training information on evaluation of software to local and district level educators;

- to provide awareness of the ten models of software evaluation reproduced in Evaluation of Educational Software. A Guide to Guides, and to give hands-on experience in using two or more of these evaluation forms with actual software;

- to provide expanded information on print and organizational resources that are useful in making software decisions.

Objectives:

The workshop packet has been designed to accomplish certain specific objectives. By the end of the training exercise the participants will be able to:

- define or identify key issues in the software selection process as those issues relate to the participant's educational situation (Rationale);
- characterize the general features of instructional design as applied to software evaluation (Section 1);
- describe and compare procedures, criteria, and formats of evaluation forms contained in Evaluation of Educational Software: A Guide to Guides (Section 2);
- discover specific elements of "good" software for their given situations through hands-on evaluation of software (Section 3);
- describe or identify print and organizational sources of information on software evaluation, reviews and databases (Section 4).

References:

For complete listings of articles, journals, and reviews devoted to evaluation of software, please refer to pages 69 through 95 of Evaluation of Educational Software: A Guide to Guides (SEDL/NEREX, Inc.)

Dunn, Rita, and Dunn, Kenneth, Teaching Students Through Their Individual Learning Styles Prentice-Hall Company, Inc., Reston, VA, 1978.

Grimes, Lynn, "Computers are for Kids: Designing Software Programs to Avoid Problems of Learning," Teaching Exceptional Children, November, 1981:49-53.

Jay, Timothy B., "The Cognitive Approach to Computer Courseware Design and Evaluation," Educational Technology, January, 1983: 22-25.

Roblyer, M.D., "When Is It "Good Courseware'? Problems in Developing Standards for Microcomputer Courseware," Educational Technology, October, 1981: 47-54.

SESSION NOTES

SECTION 1

INSTRUCTIONAL DESIGN CONSIDERATIONS IN EDUCATIONAL SOFTWARE

Most educationally-related software materials are designed with some common information-processing abilities in mind. The evaluator may wish to account for some or all of the following processes when choosing appropriate software.

Memory and Attention: (corresponds to Participant Handout #1-A)

Evidence from years of psychological testing and experimentation suggests that human beings can only deal with a certain amount of information at one time. The level of difficulty and the number of tasks required may determine the span of attention.

PRINCIPLE: Short-term memory is limited by space and time.

PRACTICE: Implement programs which:

1) Present one idea at a time: do not fill a screen with solid text. An idea in text is probably limited to one or two sentences in length.

2) Consider timing: processing text material takes time. Give the user control of the pace of instruction ("Press any key to Continue"). Timing may be self-paced and flexible.

3) Keep the user informed: in the event that the program has long delays for searching or other processing functions, watch for programs that explain the waits. A prompt on the screen, such as "I am searching" or "Wait, please, while I find that answer," might appear as an explanation for a delay. A blank screen for more than two or three seconds may be interpreted by the user as "trouble" with the machine.

4) Consider the level of difficulty: the more complex the idea presented, the more time is needed for inspection.

5) Use some type of supplemental materials: because some students often have trouble retaining a number of ideas at once, often they will perform better with printed reference materials. These may include worksheets, maps, tables, equations, diagrams, instructions or memory joggers. Materials may be either teacher's guide supplements, materials from work texts or sheets included in the program package, or teacher-made materials which support ideas in the program (this entails the teacher's advance preparation).

6) Allow for differences in level of processing: the more deeply the student is required to think about a subject, the better overall retention will be. Simple assessment of an idea ("Is the word "dog" in upper or lower case letters?") is less likely to produce retention of the word dog than a more complex task. A task/question such as "A poodle is a kind of _____", with an interactive response relating to the word dog, is more likely to produce retention in the long-term memory mode. Generally, the more cognitively elaborate the process, the better long-term memory results.

7) Have a reasonable duration of program: the greater the mental (processing) demands of the task, the shorter should be the duration in order to keep performance at a satisfactory level. In all programs, opportunities to exit without penalty should be provided.

Language or Text Characteristics: (corresponds to Participant Handout #1-B)

The way messages, instructions, and text in a program are phrased can affect student performance differentially. Simply stated, attention must be paid to the content of the message (style, syntax, vocabulary),

the type of user (adult, child, special-needs learner); and the intent of the message (to provide information, pose questions, or prompt certain behaviors).

PRINCIPLE: The performance of the student is a function of the type of message, the intent of the message, and the type of student.

PRACTICE: Supplement programs which communicate effectively with your audience by using some of the following ideas:

1) Vocabulary: new words, terminology, or jargon need to be defined and explained. Jargon should be avoided, if possible, unless the intended audience is definitely familiar with words and references used. Keep in mind that children do not always understand words in context the way adults may.

2) Humor: be careful of the type and level of humor in the program. What is funny to one group or person may mean nothing to or offend another. Sarcastic, off-hand comments inserted into programs as "comic relief" may be misinterpreted by some learners as criticisms. In general, some humor can improve the effect of a program. Keep in mind that, although often appealing to students, humor does not have any consistent beneficial effect on acquisition of information.

3) Natural communications: check to see if programs respond to and communicate with the student in a "user-friendly" manner. Users may attribute a personality to the machine and software. Many responsive programs refer to the student in the first person voice and call the student by name. Some teachers may wish to point out that the machine is not a person, but merely is responding to students in a personal manner to encourage answers and responses. Many programs use "I", "we", or "you" when directing or correcting the student.

4) Avoid "codes": programs which request an answer of "yes" or "no" should respond to "yes" or "no" rather than Y or N (or even worse, 1 or 0). If a program uses coded responses, look for those which document the fact that coded answers are going to be used and which are consistent in the practice throughout the content course.

5) Be consistent in presentation and student response modes within a program: again, consistency of format and expectations can significantly reduce errors by students confused by arbitrary changes. Consistency reduces errors and frustration. Do not switch codes or answer formats unless warning the user and explaining the reason.

6) Concrete versus Abstract: language that is graphic and grammatically simple is usually better remembered than abstract wording. Images (graphics) are better recalled than words. Younger children usually think better in concrete (real) rather than abstract (imaginary) terms.

7) Format of presentation: memory may be enhanced by multiple presentation formats. A strong basic presentation includes information presentation via more than one mode, if possible. Graphic, print, and auditory channels are all accessible on the microcomputer, and when appropriate, can improve reception and retention of a concept. While this may seem to contradict the limited capacity notion in actual practice, redundant presentation of a concept can enhance retention and performance.

8) Sentence format: generally, look for simple, concise language. Pay attention to word usage, sentence structure, and sentence length. Remember to present one idea at a time on the screen. Watch spacing between lines and words. Don't allow graphics to overwhelm printed ideas or directions visually.

9) Intentions of the message: memory for concepts can be improved by making the receiver of your message think or process information. Presenting simple material may be accomplished by basic drill-and-practice. If improvement of reasoning skills or problem solving abilities is the desired skill acquisition area, the inquiry method may be more useful. A dialog between the user and the software will require reasoning skills and result in more abstract learning. Both abstract reasoning skills and the knowledge base which is reinforced by drill/practice type settings are valuable tools for classroom learning.

Graphics and Visual Processing: (corresponds to Participant Handout #1-C)

Learners process information with all the senses. Vision is generally the dominant sense and the major input channel from the computer. Software in the future may include more graphics and color, and more animation of graphics and characters as equipment becomes more sophisticated.

PRINCIPLE: Graphics may be used to enhance retention and to encourage attention to task.

PRACTICE: Implement programs in which color is used to:

1) color code, differentiate, or highlight instructional sequences. Color may enhance the realism of graphic representations. It also directs attention to significant aspects of the display.

2) Use color cueing to direct attention to significant features and ideas on the screen. Color may be used to focus the student's attention on certain visual aspects of the stimulus. This feature might be particularly useful in teaching distinguishing features of a subject, or analogies and comparisons.

3) Graphic descriptions or analogies are helpful in describing abstract ideas. Students told to imagine a concept in light of a concrete example learn and retain such information better (i.e., imagining chemical structures as "tinker-toy" images). Such "imaging" techniques may help learners to remember concepts better than using only abstract verbal instruction.

4) Pictures, maps, diagrams and drawings may be used in conjunction with computer instruction. Some graphic displays may be unworkable via computer. Supplements are cheaper, lessen memory demands (both computer's and learner's), and in general, enhance learning.

5) Graphics may be used to emphasize important information. Special characters, underlining, blinking words, enlarged text and color are all elements which may be used as graphic emphasizers.

6) Mnemonic skills can stimulate retention. Word meanings are facilitated by imagining or visualizing the concept. Graphics which encourage students to use visual memory as a prompt can improve the effectiveness of a program.

7) Color use should agree with realistic denotations. Red means stop, green means go, etc. Confusion can occur if the program uses color inappropriately in situational graphics requiring common color relationships for credibility. The wrong use of color may detract from the effectiveness of message delivery.

8) Use color to teach relationships and differences in a display. Color should be used to denote similar functions, properties and characteristics of a concept.

Cognitive Model of the User: (corresponds to Handout #1-D)

The profile of the user or student is a collection of real and assumed abilities that the evaluator of software must formulate. It is this image of the learner and his/her capabilities that must be considered in determining appropriateness of courseware. Nearly all teachers have developed implicit models of their students and choose educational materials that fit into the perceived learning styles of the students. Students are instructed based upon these real or implied abilities which are assumed by the teacher/trainer. One of the most important functions of the computer is its ability to teach at each individual's level of comprehension. Some of the learner abilities that should be considered as variables in software selection evolve from the following principles:

PRINCIPLE: Processing abilities mature with the age of the learner. Researchers such as Piaget detail the levels of processing in their studies. The developmental reasoning growth of children and the differences in their abilities to think abstractly, hypothetically, deductively or logically are areas to incorporate in a learner's profile. These abilities usually develop in stages according to developmental age. The student must be taught at his/her level of reasoning.

All learners have individual learning styles but special education students have specific instructional needs. Gifted students are prone to boredom when presented with simplistic programming. Program courseware design for handicapped learners requires more structure and would ideally include a multimedia approach.

PRACTICE: Implement programs which are appropriate to the learner's cognitive style:

1) Entry level: It is important to consider the learner's prior experience or instruction on the topic of the courseware being evaluated. The current knowledge level

of the prospective student should determine when or if a piece of software is appropriate. Materials with too many unknowns (concepts not previously taught or encountered) can be frustrating if the program does not allow for the naive learner (via branching or reinforcing prompts).

2) Graphic presentation of a concept is an excellent means of emphasizing an idea for any age learner. Enlarged text is a type of graphics utility which may be used with young or visually impaired students. When possible, auditory or voice capability may be used to benefit students who learn best through multiple-presentation techniques.

3) Concrete reasoning can be expected in children under the age of eight, or with students who are academically handicapped and functioning at a lowered developmental level. Use descriptions and images that can be directly compared and applied. Again, multimedia presentation can enhance performance.

4) Teen-agers and bright upper elementary students can handle hypothetical situations, deductive reasoning, and problem-solving tasks at an adult or nearly-adult level.

5) Courseware that can encourage further exploration of the topic presented is useful. Play and experimentation with ideas, as well as concise statements of fact, can be used as reinforces to learners.

6) An interactive approach to learning (using dialog and questions) can encourage learners to generalize and thus better retain information. Programs can challenge a student by separating given (entry-level) knowledge from new information.

7) Some students need more "external strategies" such as printed prompts, beeps or other auditory cues, written directions, or previous orientation to a program than others. Determine whether the audience for the software being reviewed needs this sort of cuing and be alert for materials which might fit that requirement. It is possible in most cases to create teacher/trainer developed cues for programs lacking them.

Feedback: Responding Intelligently to the User (corresponds to Participant Handout #1-E)

PRINCIPLE: Use of feedback to monitor performance and behavior is a key element in successful software. Knowing the consequences of behaviors upon student performance is useful to most learners. Performance can be improved with critical information about responses. Correct behaviors can be repeated and refined, and errors reduced.

PRACTICE: Implement programs which provide appropriate response to the user:

1) Provide information for the user when performance is being scored or evaluated. Provide a score at the end of an instructional module and within the module when appropriate.

2) Keep the user informed: see Section 1, #3.

3) Rewards for correct response should be natural and varied. Avoid programs where a response is used repeatedly and exclusively as a reward for correct behavior. Printed verbal rewards should be random and varied throughout the module if possible. On the other hand, responses to incorrect answers should not be so interesting or exciting as to encourage experimentation with wrong answers.

4) Hints, or "shaper" responses, may be used to lead the user to correct responses without telling the answers outright. For example, when the question is, "What is 5x4?," and the student responds, "9," the computer might tell him/her that "You added," or "Try again, but check the operation sign first!" This is a more useful approach than a simple "wrong" or provision of the correct answer with no elaboration.

5) Allow for multiple answers to a question. Variant answers (such as spellings, sentence construction, Y or N instead of Yes or No, etc.) can be significant in many situations, and it is important that the software be capable of accepting some amount of deviation.

6) Personal responses -- I, you, we, or students' first names -- can add to the effectiveness of programming for some groups. It is not a highly motivating aspect for some audiences, however. Also, the subject matter of the courseware may not lend itself to informalities such as a dialog on a first-name basis.

7) To avoid frustration, it is necessary for students to understand the processes of error statements and correction procedures. The evaluator needs to make sure that students understand how to correct or revise an answer by backspacing and editing answers. Watch for poorly worded or ambiguous questions in the text which might encourage incorrect behaviors and responses.

8) Competition can be stimulating and rewarding. Many students (extraverted, field independent, and formal operational) respond well to trying to better their own performances as well as competing with others toward a common goal. More introverted students (field dependent) may not perform as well, in many cases.

9) Choose responses to incorrect answers with care. Programs should not punish for incorrect answers, nor should the computer's response simply provide the correct answer. First, some attempt should be made to lead the learner to discover a correct response (see "Hints" #4 this section).

10) Inform the student of the initial skills (entry level) that he/she needs to operate a program. Some programs may be instructionally sound, without overt directions for use or entry level definition. This is not necessary a facet of effective software.

Recommendations:

Currently, many problems exist in the development and evaluation of educational software. Some of the difficulty in responsible selection of courseware may be eliminated via evaluator training activities and a knowledge of options in procedures for evaluation. Procedures which might be implemented to alleviate problems include:

- training teachers in learning style and human psychology of learning, including such factors as development, cognition, questioning modes, perception, motivation and language;
- conducting research on some of the factors mentioned in this training session;
- extensive field-testing of educational materials;
- reading full courseware reviews and applying skills and information contained in the training module.
- matching individual learning styles and ability levels with particular types of software programming;
- incorporating instructional tactics to compliment the use of screen, keyboard, printer (and other peripheral devices).

PARTICIPANT HANDOUTS

Section 1

Handout #1-A

Participant Notes

MEMORY AND ATTENTION: List concerns in these areas which might relate to your situation.

PRINCIPLE: Short term memory is limited by space and time.

PRACTICE: Implement programs which:

1. Present one idea at a time:

2. Consider timing:

3. Keep the user informed:

4. Consider level of difficulty:

5. Use of supplemental materials:

6. Allow for level of processing:

7. Are of appropriate duration:

Handout #1-B

Participant Notes

LANGUAGE OR TEXT CHARACTERISTICS: Using this checklist, mention some concerns you have have regarding these characteristics of programs.

PRINCIPLE: Performance is based upon the type of message, the intent of the message, and the type of student.

PRACTICE: To communicate effectively with the student using the computer, implementation of some/all of these ideas may be useful:

1. Vocabulary:

2. Humor:

3. Natural mode of communication:

4. Avoid "codes":

5. Be consistent:

6. Concrete versus abstract:

7. Format of presentation:

8. Sentence format:

9. Intentions of the message:

Handout #1-C

Participant Notes

GRAPHICS AND VISUAL PROCESSING: List any important factors relating to graphics capabilities of the software.

PRINCIPLE: Graphics may be used to enhance retention and to encourage attention.

PRACTICE: Use color to:

1. Code, differentiate, and highlight:

2. Direct attention:

3. Describe abstract concepts:

4. Explain concepts and illustrate:

5. Emphasize important information:

6. Display mnemonics:

7. Illustrate naturally:

8. Teach relationships:

Handout #1-D

Participant Notes

COGNITIVE MODEL OF USER: Use the list below to pinpoint and discuss characteristics of learners who will be using the software you review.

PRINCIPLE: Educators must consider the learner's processing level (determined by developmental age), especially in instances where the audience is educationally a special needs group (gifted, handicapped).

PRACTICE:

1. Entry level:

2. Graphics appropriate to learner:

3. Age for concrete/abstract reasoning:

4. Teen-agers' skills:

5. Exploration of ideas:

6. Interactive approach to instruction:

7. External cues:

Handout #1-E

Participant Notes

FEEDBACK or RESPONDING INTELLIGENTLY TO THE USER: Use the following list to discuss characteristics of learners, and appropriate feedback techniques.

PRINCIPLE: The use of feedback as a monitoring device for performance and learning behavior is a key element in successful software.

PRACTICE:

1. Scoring and evaluation:

2. Keep the user informed: see Section 1, #3:

3. Vary rewards:

4. Hints:

5. Allow for multiple answers:

6. Personal responses:

7. Errors and corrections:

8. Competition:

9. Incorrect answers:

10. Expectations:

SESSION NOTES

SECTION 2

OVERVIEW OF FORMS

The forms included in the Guide to Guides have been developed by various educational groups and organizations over the past few years. The forms are organized by their overall approaches to software evaluation:

1. Evaluation strategies which are designed to be used with large groups of cooperating evaluators, operating under an organized network. These forms also function best with a given set of guidelines:

   - MicroSIFT: Developed by the Northwest Regional Education Laboratory this system uses a network of evaluators at sites across the country, evaluating information which is summarized regionally. Reviews are provided to MicroSIFT's network members and are included in the Resources in Computer Education (RICE) database. MicroSIFT's Evaluator's Guide is available to educators who are not members of the formal evaluation network.

   - EPIE/CU: The Educational Products Information Exchange/Consumers' Union has formed a network of school districts across the country to evaluate software and hardware. Evaluators at specific sites are trained to use EPIE/CU's evaluation form, and summaries of the reviews are compiled in an analysis manual which is available by subscription.

2. Evaluation strategies which have informal networking procedures include:

   - School Microware Reviews, and
   - Courseware Report Card. These publications have access to evaluators either in-house or out, who provide reviews of software based on certain set criteria. Results are compiled and available by subscription.

3. Evaluation procedures which were developed by organizations whose primary functions are the design and distribution of software for educational purposes include:

   - MECC (Minnesota Educational Computer Consortium)
   - SOFTSWAP
   - CONDUIT (publishes evaluations in Pipeline, available by subscription).

4. Evaluation forms which are designed to stand alone, and which are meant to be used by individuals or small groups:

   - National Council of Teachers of Mathematics (NCTM)
   - Scholastic, Inc.
   - Electronic Learning magazine (a synthesis of several formats of evaluation).

* * * *

At this point, turn to Page 11 of the Evaluation of Software: a Guide to Guides. Pages 11 through 68 of the Guide to Guides contain sample forms generated by 10 different software evaluation groups. Each of the different forms listed previously is included in the manual, accompanied by an abstract which outlines its potential uses to educators. Participants should refer to It is suggested that the participants form small groups in order to discuss the relative merits or demerits of the forms. Groups might wish to divide according to the four types of forms delineated in this section of notes. Another means of grouping participants for this activity would be by content (teaching) or subject (interest) areas. For example, science instructors may wish to compare opinions with other teachers in a similar field of instruction. Grade level taught is another possible category forgrouping. It is not necessary to break into small groups, particularly the participants number fewer than eight or ten. However, time may often be saved by dividing the information to be sifted, and then sharing results in a full group session.

Participants should refer to Participant Handout #2 A for recording comments relating to the forms which might be useful in their situation. Participants should identify several different forms for evaluating software as being the most appropriate ones for their situation. These forms will be used in the following section of the R_x Workshop in hands-on review of educational software.

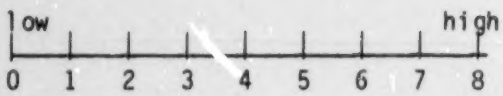
Handout #2-A

Participant Notes

EVALUATING THE FORMS: COMMENTS

Record the potential usefulness of the forms:

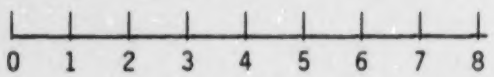
- MicroSIFT



comments:

_____
_____
_____

- EPIE/CU



comments:

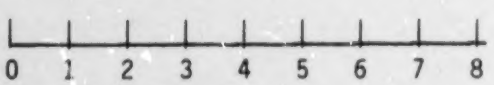
_____
_____
_____

- School Microware Reviews

comments:

_____
_____
_____

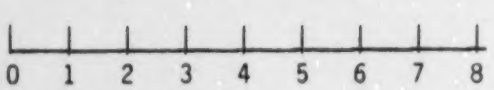
- Courseware Report Card



comments:

_____
_____
_____

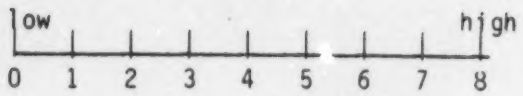
- MECC



comments:

_____
_____
_____

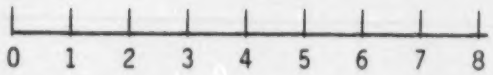
- SOFTSWAP



comments:

_____
_____
_____

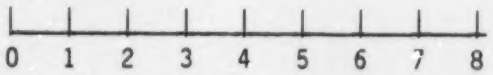
- CONDUIT



comments:

_____
_____
_____

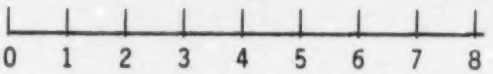
- NCTM



comments:

_____
_____
_____

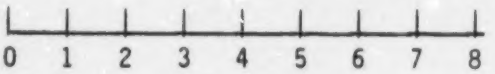
- Scholastic



comments:

_____
_____
_____

- Electronic Learning



comments:

_____
_____
_____

SESSION NOTES

SECTION 3

EVALUATION OF SOFTWARE: APPLICATION

Included in the B_E Workshop packet are examples of educational software programs that range from simple remedial through specific content-skill lessons. The intent of including sample software in the package is to allow comparison of evaluation forms among participants.

Participants should have by this point chosen at least two of the forms found in Guide to Guides as appropriate for their evaluative needs. The group leader may wish to have multiple copies of each form duplicated to allow participants to write on the forms during the exercise without damaging original copies. Groups of participants may be formed for evaluation practice by several methods. If there is a shortage of hardware, groups of no more than three may share a machine. When sharing a machine, participants will wish to take turns interacting with the computer keyboard (acting as the student). Another means of grouping would be by forms chosen. Participants who have selected the same form(s) for practice evaluation may find it less time-consuming and more productive to evaluate as a team.

General guidelines:

1. It is not necessary to evaluate all of the programs included on the diskette enclosed. Participants may chose the programs that are applicable to their situations (3 or 4 programs are a good sample).

2. The programs vary in character. Some are "good" and others not so "good," at first glance. Variations in first impressions often depend on the evaluator's background and amount of experience with educational computers. The purpose of the exercise is to allow experimentation with real situations which could occur during evaluation sessions.

3. Run through the entire program at least once so that the format, directions, and other characteristics of the program are exposed. Do this before beginning the written evaluation.

4. Complete one evaluation form before beginning on the other. Trying

to complete any portion of the forms concurrently will usually be confusing.

NOTE:

If the sample software included in the packet is not compatible with the brand of computer available to the participant, participants can still become involved in group evaluation.

The group leader for the session should collect sample programs from local schools or from resource centers at district or regional service centers which are compatible with the available computers. Include a range of content and ability-requirement levels. The process of evaluation is unfortunately more cumbersome when more than one diskette is used. In order for the process of evaluation and comparison to function, each machine must be loaded with the same programs individually, with participants sharing the program diskette. The trainer may take responsibility for this function or appoint a knowledgeable participant to load the machines. Another program may be substituted when participants finish with the first. Depending upon time constraints, the session should include at least three or four separate lessons in the evaluation section.

SESSION NOTES

SECTION 4

COMPARISON OF FORMS

When all participants have completed evaluating at least three lessons on each of the forms selected in Section 2, the whole group should reorganize in order to discuss findings.

Large group discussion should include the following steps:

- Determine which forms were used. Make a master list. Ideally, at least eight out of ten forms will have been used by participants.

- Using chalkboard or wall charts or an overhead projector with blank acetate sheets, list as a heading the title of the form. Each form used should have its own set of comments written in some manner by the leader.

- Direct participants to Handout #4. Comments on forms used by the group may be recorded on this handout.

- With the group leader functioning as a facilitator, elicit comments from the group regarding the usefulness of the forms they employed in evaluation.

  The trainer may:

  * focus comments by referring to the small-group comments on the forms (Participant Handout #2-A).
  * include positive and negative aspects of the evaluation form.
  * discuss one form at a time.
  * find that, ideally, participants will have selected a variety of forms, so that the group will receive an overview of a larger sample of their peers' opinions. However, the facilitator may find that the group has chosen to employ only three or four different forms. This would probably be common in a homogeneous group of participants (all math teachers or all second-grade teachers, for example).

* remind participants that this exercise is intended as a means of familiarizing them with evaluation formats. The quality and appropriateness of the sample software is not in question -- it is the process of evaluation that is important.

Note: The means of recording group responses to the forms is by using wall charts or overhead projector transparancies to make a "master list" of comments regarding the uses made of the forms. The group leader should be responsible for recording (and clarifying) comments on each form. Participants should be reminded that the forms used in this particular session should be evaluated in light of the situation: the training activity is an artificial setting designed to expose participants to various evaluative instruments included in the Guide to Guides. The forms chosen and used in these hands-on procedures may not necessarily be the "best" or the only ones applicable to software they will be evaluating in the future.

Handout #4

Participant Notes

EVALUATION COMPARISONS: Evaluator's position: _____

Grade/level of software: _____

Discuss and comment on the usefulness of the forms selected for hands-on evaluation activity:

FORM 1 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 2 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 3 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 4 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 5 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 6 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

FORM 7 TITLE: _____

PRODUCER: _____

Comments:

PRO CON

SESSION NOTES

SECTION 5

SOFTWARE REVIEWS AND RESOURCES

The "Software Reviews" section of the Guide to Guides* manual includes three sample software reviews. Participants may wish to go through these samples as a means of discovering contrasts in technique. An interesting outside task might be to obtain several reviews from different sources focusing on the same software program. Characteristics of reviews which relate to local needs may be noted at that time.

Commercial software reviews are a good point for beginning the process of software selection. They can help educators decide whether potential purchases are worth evaluating at a local level by software selection committees or individuals.

* Participants may be directed to pages 69-76 (Guide to Guides)

Resources:

The resource section of the Guide to Guides* represents the most comprehensive collection of information sources available at time of publication. Categories of resources include books, directories (of software evaluation materials and reviews), articles dealing with a wide range of software related themes, and clearinghouses and information centers (some related to user-groups such as CUE and MECC). Included are names of periodicals and reports centered on software reviews, periodicals containing software reviews, and computer-accessible databases containing information on educational software and evaluations. In addition there are annotated descriptions and order forms for various publications from the Regional Exchange at SEDL and from NEREX.

* Participants may be referred to page 77-96 (Guide to Guides).

MORE SUGGESTIONS FOR THE SESSION LEADER

So you want to have a workshop . . . here are some ideas which will make the process more profitable for the participants and easier for the group leader.

1) Gather all of the materials needed before the workshop:

   - R_x Workshop packet (contains R_x Workshop manual, Guide to Guides (SEDL/NEREX) and a software sample disk)
   - One copy of Evaluation of Education Software: A Guide to Guides for each workshop participant
   - Wall charts and markers for recording group discussions (substitutes: chalkboard, or overhead projector and markers)
   - Pencils and note pads for participants
   - Microcomputers (ideally, no more than three participants should have to work at one maching concurrently)
   - Power cords for the machines

2) Check your computer hardware for compatibility with the sample software included in the packet. The disk in the package is designed for use with a TRS-80, Model III Microcomputer, and will not operate on another brand of computer.

   IF YOU HAVE ANOTHER BRAND OF COMPUTER:

   The group leader will wish to locate examples of educational software which represent a range of grade levels, and topic/content areas, as does the sample disk. The leader may check with local schools, regional centers, libraries, and vendors in the area who might be willing to loan or donate software for use in the workshop.

3) Set up microcomputers for the hands-on session. It would be ideal if each participant could have access to his/her own terminal, but this usually is not the case. Set up available machines in comfortably small groups (2 or 3 individuals at each microcomputer) and stress that each person in the group have an opportunity to interact with the computer at some point during the hands-on sessions.

4) Resources for display may be obtained from various sources:

   - Catalogs: Look for companies which classroom test or teacher-approve their materials. The classroom-oriented producers often will donate copies of catalogs and directories for distribution to workshop participants.

   - Journals/Reviews: Look in the back of the Guide to Guides for some suggestions on journals and magazines that address classroom and educational microcomputing practices directly. If possible, obtain some current copies of several publications for display during the workshop.

- Commercial or Publishers' Reviews: Request reprints or photocopy published reviews of existing software which might impact the classroom situations of the participants. A good tool for practicing the evaluation of software is to obtain a copy of a commercial program or package that has been reviewed by another party. In a hands-on setting, review the material, and compare results with the published review. Perspective may thus be gained by the participants as to how accurate and reliable a journal review of educational courseware may be in their respective situations.